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The impact of capital structure on the performance of Greek banks

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I hereby declare that the work submitted is mine and that where I have made use of another's work, I have attributed the source(s) according to the Regulations set in the Student's Handbook.

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Abstract

This dissertation was written as part of the MSc in Banking and Finance at the International Hellenic University.

This thesis examines the impact of capital structure on the performance of the banking sector in Greece. The analysis is based on the annual financial statements from 2007-2018 of the four systemic Greek banks listed on the Athens Stock Exchange (ASE) such as: Alpha Bank S.A., Eurobank Ergasias S.A., National Bank of Greece S.A., Piraeus Bank S.A. Regression analysis has been carried out through the use of Econometric Views (EViews) 9, having Return on Assets (ROA), Return on Equity (ROE) and Earnings per Share (EPS) as performance indicators along with Debt-to-Equity (D/E) and Debt-to-Assets (D/A) ratios as proxies for capital structure, considering profitability as a dependent variable and capital structure as an independent one. Moreover, two control variables, namely the banks' Size and the banks' annual Growth rate were also included in the model. The study reveals that capital structure has a significant impact on the banks' performance and presents mixed results since it concluded that the capital structure has both negative and positive impacts on the banks' performance. Capital structure was found to have both negative and positive significant relationship with Return on Equity, while Debt to Assets has a significant positive relationship with Return on Assets and Debt to Equity has an insignificant negative relationship with Return on Assets. Accordingly, Return on Assets was found to have insignificant positive relationship with capital structure.

Keywords: Capital Structure, Bank Performance, Greece, Systemic Banks

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Preface

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Introduction

The theory of capital structure and its connection with the firms' performance attracted the interest of many researchers in corporate finance literature since the Modigliani and Miller's theorem (1958). In the purpose of mitigating any kind of risk such as operational, credit, market, the Basel Committee issued guidelines regarding the minimum capital requirements of the banks. The banking sector in most economies of the world is of vast importance since it is connected to economic growth. Abor (2005) presented that bank's profitability is highly influenced by capital structure. The pursuance of the optimum mixture of debt and equity appears to be a constant in the strategic planning of the firms as well as for financial institutions in such a way that would assist them to curtail their risk exposures by taking absolute advantage of their overall market value. It is also important for the Greek banks to have the ability to finance their operations on the basis that their profitability is maintained on high levels. Moreover, during the years and due to the technological progress, the competition in the banking sector has been increased and resulted to significant changes in the financial and monetary banking environment (Spathis et al., 2002).

Capital structure plays a crucial role as a reference theory in the financing policy of a firm. A mix of debt and equity financing is the main component of the capital structure. One of the most complex matters of corporate finance is associated with whether this capital structure is optimal or not. Therefore, the decision of the optimum mixture of debt and equity should be strategically designed in order to achieve the maximization of the firm's returns or the shareholders' wealth and reach the desired levels of profitability. The current price of the firm's shares represents the shareholders' levels of wealth. In pursuance to this goal, the firm's management should take rational financing decisions that would minimize the firm's cost of capital (Goyal, 2013).

The modern theory of capital structure is based on the pioneer work of Modigliani and Miller (1958). As Modigliani and Miller preliminary stated in their capital structure irrelevance theory which was published in 1958, under perfect capital market conditions, the mixture of debt and equity through which a firm finances its assets, has no significance in the value of the firm. However, this preposition was based on the assumption of perfect capital markets and consequently, not long after, Modigliani and Miller (1963) released an emendation of their prior paper, stating that debt's tax deductibility would avert the "arbitrage process from making the value of all firms in a given class proportional to the expected returns generated by their physical assets". Variant theories such as the pecking order theory, the static trade-off theory and the agency cost theory have risen in the later years, trying to enlighten the firm's capital structure decision.

As a result of the comparison between debt with equity, it is evident that debt is cheaper than equity (Modigliani and Miller, 1958), however it entails some constraints by the means that it can impact the firm's leverage up to a certain degree (Brealey et al., 2012). Debt to Equity ratio as a proxy for the capital structure condition of a firm shows the proportion of the firm's debt and equity and can be calculated by the division of the total liabilities of a firm by its stockholders' equity. Moreover, a high Debt to Equity ratio indicates that a firm is quite leveraged and that it relies more on its debt rather than its equity. As regards to the banking sector, in order to assess its performance, profitability is the ultimate measure. Profitability is related with the capability of a firm to efficiently use its resources within its business activities in order to create profit, and thence it can be used as a proxy to measure efficiency. The combination of the following ratios: Return on Assets (ROA), Return on Equity (ROE) and Earnings per Share (EPS) can present a quite precise indicator as far as profitability is concerned.

Numerous of studies have examined the effect of the connection between firm's performance and capital structure under different circumstances; however the results

showed that there is no consensus. Thence, there is a necessity for further research with the objective to shed light into the interrelation between profitability and capital structure.

1 Literature Review

1.1 Theoretical Literature Review

1.1.1 Capital Structure and Theoretical Framework

Capital structure refers to the way firms or financial institutions finance their overall operations by using a mix of sources such as debt, preferred stock and issued equity. In general, capital structure illustrates the proportion of debt and equity as regards the total capital of a firm, that will be invested within a long duration, in other words its long-term financial mix. The capital structure decision of a firm or a financial institution refers to the decision of the proportionate relationship of the long-term financial mix. In the best possible scenario, as regards banks, a financial manager should be able to determine the optimum mixture of debt and equity in order to minimize its cost of capital and maximize its market value.

1.1.2 The Modigliani and Miller's Irrelevance Theory

The theoretical framework of capital structure was shaped by Modigliani and Miller(1958) whose pioneer work set the ground for a numerous set of theories that were developed in the following years. Modigliani and Miller(1958) argued that the assurance of a firm's value is not related to the capital structure;under the condition of miscellaneous assumptions of perfect capital market such as lack of taxes, perfect capital markets, homogenous expectations and no transaction costs. Their famous "Irrelevance Theorem" stated indeed that the value of any firm is not related to its financing decisions. Under Modigliani and Miller's first proposition of perfect capital markets, there is no optimal capital structure mix and therefore a capital structure mix that is superior to other does not exist.

In M&M's "perfect capital markets" all kinds of investors and traders have the same access to information and there are no brokerage fees, transferred taxes and transaction fees incurred(1961). "Rational behaviour" for M&M referred to investors that are wealth maximizers and indifferent of the form in which their wealth is transformed into; cash payments or an increase in the market value of their shares. Moreover, "perfect certainty", signifies the complete assertion for all the investors as regards " the future investment program and the future profits of every corporation"(Miller and Modigliani, 1961, pp.412). Having said that, their second "Irrelevance Theorem" proposition stated that "given a firm's investment policy, the dividend payout policy it chooses to follow will affect neither the current price of its shares nor the total return to its shareholders" (Miller and Modigliani, 1961, pp.414). That is, in perfect capital markets, neither capital structure decisions nor dividend payout policies are significant.

Not long after, the assumptions of M&M's propositions were found to be unrealistic, a fact that led Modigliani and Miller to proceed with the issuance of a correction of their previous theorem, admitting the effect of income taxation on the market value of firms, in 1963. The "expansion" of their theorem presented the view that the tax deductibility of debt would prevent the "arbitrage process from making the value of all firms in a given class proportional to the expected returns generated by their physical assets" (Modigliani and Miller, 1963, pp.433-434). According to them, the increase of debt decreases the average cost of capital upon the effect of the interest tax shield, whereas at the same

time the market value and the return on equity increase, hence firms should increase their debt proportion as regards their capital structure (Jaros and Bartosova, 2015). However, Modigliani and Miller underlined the fact that this tax advantage for debt financing doesn't make it unquestionable for firms to pursue the maximum available amount of debt in their capital structures, because sometimes other forms of financing might be proved to be cheaper (Modigliani and Miller, 1963).

In practice, the correction of the M&M theorem was difficult to accept, since it did not include a crucial variable, the cost of financial difficulties. As regards Miller and the optimization of the capital structure, he intended to incorporate both the corporate and the individual taxes into this theory, which indeed was published in 1977. He concluded that the purpose of each firm is to achieve the minimization of the present value of all the taxes that it pays, and not the minimization of the firm's individual tax shield. Moreover, he was the first to introduce the conceptual framework of personal taxes and specified that taxes also included the ones that are paid by firm's shareholders of stocks and bonds (Miller, 1977).

It is true that the Modigliani and Miller theorem at some level provided an unrealistic approach of how firms finance their overall operations. Nevertheless, their work was a stepping stone for the development of numerous future theories of capital structure and changed the world of corporate finance theory. Among these theories, there are four major ones that deviate from Modigliani and Miller's assumption of perfect capital markets: Trade off theory, Pecking order theory, Agency cost theory and Market timing theory.

1.1.3 Trade-off Theory

Trade-off theory was originally emerged through a debate over the Modigliani and Miller theorem. It is considered a development of M&M's theory however it also includes the impact of bankruptcy costs and taxes. By including these market imperfections, a firm is "setting a target debt-to-value ratio and gradually moving towards it, in much the same way that a firm adjusts dividends to move towards a target payout ratio" (Myers, 1984, pp.576). In other words, trade-off theory suggests that firms balance the costs and benefits of equity versus debt in pursuance of obtaining a target debt ratio.

Under the static trade-off theory, firms should supersede equity with debt and vice versa, up to the point that the firm's value is maximized (Myers, 1984). This means that if there are no costs of adjustment, the optimal ratio for each firm should be its perceived debt-to-value ratio.

Part of the Modigliani and Miller's (1958) theorem was the presumption that there were no taxes. As an evolution of this theorem, trade-off theory, walks the same path but also implicates the effect derived from the presence of taxes, bankruptcy and agency costs. Accordingly, the optimal capital structure is described as the balance between bankruptcy costs and tax benefit arising from debt. Bankruptcy costs are described as costs that are straightly provoked when a firm's probability of default is higher than zero. As the level of debt increases, the probability of bankruptcy follows the same direction in the dread that the firm might find it difficult to produce the necessary profits in order to cover its interest payments. Furthermore, costs of bankruptcy might be direct and indirect. Liquidation cost, a component of bankruptcy costs, reflects the loss of the firm's value and includes the distribution of the firm's assets to claimants. However, the main cost that a firm realizes is the cost which has been occurred upon the firm and its stakeholders (Warner, 1977). Another cost which is derived from the conflicts of interest among the numerous stakeholder groups of the firm, is referred to as agency costs as described by Jensen and Meckling (1976). In their study, Jensen and Meckling (1976) focused on the conflict of interest between the principals and the agents of the firms.

A disadvantage of the condition when a firm relies more on debt is the cost of probable financial distress. Therefore, by including the agency costs variable into the trade-off theory, the decision regarding the firm's capital structure choice happens by trading off

the tax shield benefits of debt and the costs of financial distress when it relies more on debt, and by trading off agency costs of equity with agency costs of debt. Consequently, it is evident that the tax shield benefits and the costs of financial distress are equalized.

Main variables of the trade-off theory are the significance of tax-shield derived from debt and the information asymmetry that exists in the financial capital markets. Particularly, because of the fact that the interest on debt has the benefit of being a tax deductible expense, firms are being able to save tax by using more debt. However, personal taxes can perplex this process (Miller, 1977). Moreover, regarding the information asymmetry variable, it means that each party in the financial market has different information with regards to the market conditions. In such case, the participant who is more informed in a transaction is the one who benefits the most.

There are also other theories regarding the optimal capital structure, such as the one suggested by DeAngelo and Masulis (1980), which was an extend of Miller's analysis that fused into the capital structure model the non-debt tax shields such as depreciation. Opposed to Miller's (1977) debt irrelevance preposition, DeAngelo and Masulis (1980) presented an optimum, non-zero, degree of debt (Swanson et al., 2003). More specifically, they presented the optimal ratio of debt for a firm on a theoretical basis, whereas "in market equilibrium, each firm will have a unique interior optimum leverage decision which equates the present value of the expected marginal net tax advantage of debt to the present value of expected marginal default costs" (DeAngelo and Masulis, 1980, pp.20). Moreover, one of the most important findings of their study was the positive relationship between leverage and effective tax rate.

1.1.4 Pecking order Theory

Another important theory for capital structure is the pecking order theory which suggests that firms should finance their operations by using firstly their internally generated sources such as retained earnings rather than resorting to external sources of financing(debt and equity). Accordingly, firms' managers design the financing strategy by giving priority to the retained earnings of the firm where there is no presence of information assymetry, then in the need of supplementary funding they will proceed with the issuance of debt, and only as a last resort they choose to issue equity in order to deal with any further capital requirements. As far as information asymmetry theories are concerned, Myers and Majluf (1984) in their study suggested a similar point of view, that indeed there is a hierarchy in the way firms choose to finance their overall operations. As far as investors are concerned, they cannot make precise estimations regarding the value of the shares that are issued for financing reasons, because of the information asymmetry. Consequently, on the one hand the announcement of stock issuance could signal positively on the investors by means of future potential growth, while on the other hand it could have a negative signal in the case that managers are attempting to issue overvalued shares. However, Myers and Majluf (1984) advised that managers who are market-value maximizers, in case they appear to be more informed than outside investors that are rational, will deflect external equity financing.

Pecking order theory presents the view that firms prefer to sell equity when there are such market conditions, which render equity overvalued (Myers, 1984). The assumption that managers act in favor of the firm's shareholders, attributes to the establishment of this view. Consequently, managers will proceed with the issuance of depreciated shares only on condition that the transmission of value from the already existing shareholders to new investors is enough in order to outweigh the growth opportunity of the net present value. (Constantinides, et al., 2003)

It is true that debt as compared to equity has a preceding claimant on the firm's earnings and assets, while equity constitutes the residual claimant. Having said that, investors in debt, are presented to have a limited susceptibility to errors connected with the valuation of the firm. Managers, on faith that the shares of their firm are underrated, will seize the opportunity to issue debt rather than equity. The issuance of equity in the case that the

option of debt is available as well, will have an adverse impact on the managers' objectives. Solely when debt appears to be high-priced and the threat of financial distress is evident, managers will proceed with the issuance of equity.

Under the pecking order theory, when external funds are necessary for financing reasons, firms will always prefer to firstly issue the safest security, that is debt, before equity. In the event that further funding is required, firms choose from the safer to the riskier debt, as the theory suggests, and will lastly employ equity under the threat of financial distress. Thence, the aggregated demand for external financing is depicted by the total debt ratio of the firm. This theory, illustrates that the motive of a profitable firm, is to borrow on a low volume. This is explained by the fact that profitable firms happen to have more internal sources of financing accessible, therefore their need for external sources is limited as compared to less profitable ones.

Both pecking order and trade-off theory suggest that managers take action in favor of the shareholders. However, their main difference is centered to the fact that pecking order theory regards as shareholders only the existing ones while trade-off theory also includes the probable ones. Moreover, empirical evidence bolsters the arguments of both these theories. Titman and Wessels (1988) and Fama and French (2002), in their studies, presented evidence that constituted both pecking order and trade-off theories to be acceptable. They demonstrated that there is a negative connection amidst current debt levels and measures of past profitability (Chen et al., 2013). More specifically, Fama and French (2002) supported that firms with more investments as compared to their earnings, have lower target dividend payouts since they have lower free cash flows, as also suggested by the trade-off theory. Further on, they showed that the marginal relationship between book leverage and investments is positive, which is also presented in the pecking order theory. Particularly, that is that firms with high profitability inclined to their investments do indeed have less leverage.

1.1.5 Agency Cost Theory

Agency costs occur from the extended use of debt in the capital structure of firms. Corporate governance theory presumes that agency costs are influenced by leverage and therefore they affect the firm's performance. Both in financial and non-financial institutions, corporate governance underlines the importance of agency costs. In a well functioned firm, the segregation of ownership and control has a ripple effect: managers choosing to act solely on their benefit, employing less work effort and thence failing to expand the firm's value. (Berger and Di Patti, 2006)

Theory, presents the view that the choice of capital structure could aid to allay these agency costs. As per the agency cost hypothesis, high leverage and low equity/asset ratio encourage managers to act on the shareholders' interests and therefore mitigate the agency costs and expand the firm's value. In other words, agency cost theory suggests that an optimum capital structure can be achieved through the minimization of the costs arising from the conflicts of interest among the managers and the shareholders of the firm and those between debt-holders and shareholders. Jensen and Meckling (1976) pointed out in their paper, that leverage could be utilized as a tool to guide the managers to go after the firm's objectives and goals instead of pursuing their own. High financial leverage through the probability of liquidation could have a direct impact on the salaries and the stature of the managers (Williams, 1987). Thence, high levels of leverage are expected to lower agency costs, diminish managerial incompetence and improve managerial and firm performance (Aghion et al., 1999).

Furthermore, Jensen (1986) underlined the fact that debt creation engages firms to pay out cash, so that the level of "free" cash that would have been potentially available for managers to be exploited, is eventually decreased. The advantage of debt financing is exactly the alleviation of the conflict between managers and shareholders (Harris and Raviv, 1991). Myers (1977) presented the view that equity holders might be lacking interest to invest new capital even in value increasing schemes, when there is a

probability for the firm to go bankrupt. The reason is that the outcome of the investment is principally realized by the debt holders, whereas equity holders carry only its total cost. The higher the debt levels, the more likely the dismissal of projects that are value maximizing is.

Agency costs and capital structure decisions are quite important matters for the banking industry. Due to the fact that banks have the tendency to hold private information of their credit counterparties, agency costs are thought to be substantial. Moreover, banking regulation is structured in such a way to have a direct impact on the capital structure of the banks, by establishing a minimum of requirements for equity capital and other classes of capital in pursuance of the depreciation of redundant risk. Moreover, on the grounds that the banking industry plays a vital role in the stabilization of the economies, being a credit supplier to non-financial institutions and channeling the monetary policy, corporate governance, capital structure and agency costs are issues of vast importance (Berger and Di Patti, 2006).

1.1.6 Market Timing Theory

Market timing theory is the most recent of the capital structure theories which was presented by Baker and Wurgler in 2002. The market timing theory of capital structure indicates that the current capital structure is the aggregated result of previous attempts to record the equity market. It suggests that firms prefer to resort to external equity when its cost is low, and alternatively they choose debt. More specifically, the firm's decisions regarding its financing signal the outcome of the past adjustments to its stock price, and additionally its objective to time the market. When the financial market has such disadvantageous circumstances that lead to strict control on behalf of the shareholders, firms' managers face a limitation against the market's restrictions and recourse to the issuance of less risky debt (Ahmadimousaabad, et al, 2013).

The empirical work conducted by Baker and Wurgler (2002), showed that there is a negative relationship amidst current market leverage and extrinsic finance-weighted average of historical market-to-book ratios, as a result of market timing. This challenged both the trade-off and pecking order theories by the assumption that the observed capital structure is the result of precedent attempts to time equity issues. Pecking order theory assumed that financial markets have quasi-strong efficiency, thence an announcement of securities issuance would result to extended information asymmetry. Market timing theory does not rely on the expectation that financial markets have a quasi-strong form of efficiency and that this efficiency is maintained. This can only happen on condition that the cost of equity shows an inconsistency over time, despite the reasons the led to this situation, so that market conditions let managers exploit the opportunities that have risen.

As Baker and Wurgler (2002) suggested, equity market timing is the process of high-priced share issuance and their impending repurchase at a lower price. The purpose is to utilize this momentary inconsistency of the cost of equity as compared to other structures of capital. Conforming to neutral market conditions, firms finance their operations as per the pecking order theory that is to opt for external sources to internal ones and choose equity as the last means of financing. Nevertheless, when firms seek external financing and there are such market conditions that debt is more costly than external equity, firms prefer the latter. In contrast, trade-off theory suggested that market anomalies create a connection between leverage and firm value and firms take actions in order to counterbalance the divergence from their optimal debt ratios. Moreover, it denotes that in case of no adjustment costs, firms should never avert from their optimal leverage.

Various studies based on the market timing theory, Hovakimian et al. (2001), Welch (2004), Kayhan and Titman (2007) also supported that the history of the firm's market value has an effect on the issuance of equity. More indicatively, Welch (2004, pp.107) stated that "[.] over reasonably long time frames, the stock price effects are

considerably more important in explaining debt-equity ratios than previously identified proxies. Stock returns are the primary known component of capital structure and capital structure changes.”. Hovakimian et al. (2001) found evidence that were consistent with the view that managers that possess exclusive information time the issuance of equity as well as their repurchase decisions and that firms with low market-to-book ratio are prone to the issuance of debt rather than equity. Despite the evidence that market timing exists, Kayhan and Titman (2007) presented information that market timing did not include its long term effect on the firm and the fact that firms move towards a target debt ratio.

1.2 Empirical Literature Review

The empirical literature shows that there are numerous of studies that aim to provide evidence regarding the connection between capital structure, banks' and firms' performance. On the one hand, researchers conclude that there is a positive relationship between capital structure and bank performance, whereas others argue with this opinion and suggest that there is a negative relationship on the performance of the banks.

1.2.1 Banking Sector

Berger and Di Patti (2006) studied the impact of the agency costs hypothesis on banks' performance by using data on the U.S. banking industry and more specifically their focus was pointed towards the commercial banks. Their study showed a consistency with the agency costs hypothesis that is that all others being equal, lower equity capital ratio or higher leverage is connected to higher profit efficiency.

Amidu (2007), in order to examine the forces involved in the determination of the listed banks in Ghana used numerous variables and concluded that there is a negative relationship between leverage and profitability. More specifically, his study showed that asset structure, bank size, corporate tax, growth and profitability have indeed an impact on the banks' capital structure or financing decisions. Furthermore, banks' leverage was found to be negatively related to operating assets and short-term debt and leverage resulted to be moving in the same direction.

Awunyo-Vitor and Badu (2012), also empirically investigated the relationship between leverage or capital structure and the performance of the listed banks in Ghana from 2000 to 2010. Their results showed that there were high levels of gearing between the sampled banks from Ghana Stock Exchange. Their regression results underlined the fact that there was an inverse relationship between capital structure and Return on Equity and Tobin's Q.

Goyal (2013), investigated the impact of capital structure on the profitability of the public sector Indian banks that were listed on national stock exchange during the years 2008 to 2012. Goyal (2013), in order to demonstrate this relationship used regression analysis as methodology and the Return on Equity (ROE), Return on Assets (ROA) and Earnings per Share (EPS) ratios as measures of profitability. He showed that there is a positive relationship between the short-term debt ratio of the public-sector banks in India and their profitability.

The impact of capital structure on the performance of banks was also examined by Taani (2013), who collected data from the Jordanian banks that were listed in the Amman Stock Exchange. For the purpose of estimating those two variables, Taani (2013) used Net Profit, Return on Capital Employed (ROCE), and Net Interest Margin as performance indicators and Total Debt was used for the capital structure variable. Evidence showed that there is a positive relationship between the performance indicators and total debt ratio.

Hasan et al. (2014) studied the impact of capital structure on the performance of 36 firms listed in Dhaka Stock Exchange in Bangladesh. They used as measures of performance and dependent variables: Earnings per Share (EPS), Return on Equity (ROE), Return on

Assets (ROA) and Tobin's Q, whereas as independent variables they used three capital structure ratios: short-term debt, long-term debt and total debt. By using panel data regression method, the paper concluded that EPS is significantly positive related with short-term debt and significantly negatively related with long-term debt. Moreover, the study suggested that there was a significant negative connection among capital structure and ROA and furtherly that there was no statistically significant relationship between capital structure and firm performance as measured by ROE and Tobin's Q.

Tarek Al-Kayed et al. (2014), by the use of a sample including 85 Islamic banks' banking systems in 19 countries, examined the effect of capital structure on the Islamic Banks' performance. Their results indicated that capital structure positively affects profitability as assessed by Return on Equity (ROE), Return on Assets (ROA) and Profit Margin (BTP/TA). Moreover, they concluded that an increase in financing in length of consumer and short-term financing has a direct positive impact on the banks' profitability.

Hawaladar et al. (2016), analyzed the financial performance of retail and wholesale Islamic banks that were operating in Bahrain. Their study found evidence that there is a significant positive correlation among operational efficiency ratio, staff cost to income ratio and cost to income ratio of wholesale banks. Their empirical results for the retail banks, showed that there is a negative relationship amidst asset utilization ratio and staff cost to income ratio, operational efficiency ratio and cost to income ratio.

Musah (2017) examined the effect of capital structure and banks' profitability as measured by ROA, ROE and long-term, short-term and total debt ratios. The study used as a sample 23 commercial banks in Ghana and showed that long-term and short-term debt ratios are negatively related to profitability whereas the total debt ratio was found to be positively related to profitability.

Siddik et al (2017), in their study tried to fill the gap between capital structure and banks' performance. By using a sample of 22 banks for the period of 2005 to 2014 and as measures of profitability Return on Assets (ROA), Return on Equity (ROE) and Earnings per Share (EPS), their study empirically investigated the impact of capital structure on the performance of the banks in Bangladesh. Their results showed that all capital structure variables, Total Debt to Assets (TDTA), Short-Term Debt to Assets (STDA) and Long-Term Debt to Assets (LTDA), have a significant inverse impact on ROA, while TDTA and STDTA were found to have a significant negative impact on ROE. Moreover, as regards EPS, LTDTA and STDTA they also appeared to have a significant negative relationship.

1.2.2 Other sectors

Gleason et al. (2000), who used data that concerned the European countries for the retail sector and measured the firm's performance with the return on assets (ROA) ratio, found out that capital structure has a significant negative effect on the firm's performance.

Hadlock and James (2002), in their study by using a sample of 500 firms, found a rather positive relationship between capital structure and firms' performance and underlined the fact that firms observed with high profitability tend to have also high levels of debt. On the same route, Deesomsak et al. (2004) also found results regarding the Asia Pacific region, which suggested that the capital structure of the firm has a negative relationship with the firm's performance. Deesomsak et al. (2004) used as a measure of performance the gross profit margin ratio.

Abor (2005) also investigated this relationship in the listed firms in Ghana. The results suggested a significantly positive relation between Return on Equity (ROE) and short-term debt to total assets ratios. Regardless of this, there were also findings that were negatively connecting Return on Equity (ROE) and long-term debt to total assets ratios as well. However, taking into account the total amounts of debt and return, evidence showed positive correlation between the Return on Equity (ROE) ratio and the ratio of

total debt to total assets. Furthermore, he included that as far as highly profitable firms were concerned; debt appeared to be a major source of financing.

Huang (2006) in his paper that concerned Chinese listed companies used the Return on Assets (ROA) ratio as a measure of performance and the ratios of long-term debt and total debt as measures for the capital structure. Huang(2006) found negative correlation among capital structure and firm performance.

Margaritis and Psillaki (2007), in their relevant study, used as a sample French manufacturing firms and examined the connection between ownership, capital structure and firm performance among different industries. Their results, also found evidence of positive relationship between profitability and capital structure.

Weill (2008), studied the relationship among financial leverage and firm's performance by using data from seven European countries. The findings in Belgium, France, Germany and Norway showed a significant negative connection. The ones in Italy and Spain showed a significant positive relationship between financial leverage and firms' performance.

Ebaid (2009) showed that the connection of the performance on the emerging economy of Egypt and the capital structure is quite frail. As measures for the firm's performance, he used short-term, long-term and total debt to total assets ratios and showed that they are insignificantly connected with the performance of the sampled non-financial firms which was measured by Return on Equity (ROE). Moreover, the results showed that long-term debt was negatively and insignificantly correlated with Return on Assets (ROA) whereas total debt and short term debt to assets ratios were significantly and negatively connected to the firms' performance.

San and Heng (2011) in their paper also investigated the same relationship, but more specifically they used data on construction companies in Malaysia before and after the global economic crisis of 2007. Their results showed that there is indeed a relationship between firm performance and capital structure.

Gill et al. (2011) by using a sample of 272 American firms listed on New York Stock Exchange (NYSE), investigated the relationship among capital structure and profitability. Their results showed a positive relationship between short-term, long-term and total debt as regards profitability measured by ROE.

Chinaemerem and Anthony (2012) in their paper used a sample of 30 non-financial firms that were listed on the Nigerian Stock Exchange and studied the connection of their financial performance with capital structure. The data concerned the years from 2004 to 2010 and were analyzed using the Ordinary Least Squares (OLS) method. Their conclusion was that the firms' capital structure has a significantly negative impact on Return on Assets (ROA) and Return on Equity (ROE).

Shubita and Alsawalhah (2012) examined the effect of capital structure on profitability by using data of industrial companies listed in Amman Stock Exchange during 2004-2009. By the use of multiple regression analysis, they concluded that there is a significant negative relationship between debt and profitability and suggested that profitable firms tend to choose equity as their main financing option.

Vatavu (2015), aimed to establish the relationship between the capital structure and the financial performance of Romanian manufacturing companies, listed on the Bucharest Stock Exchange, over a period of eight years. The results showed that as main determinants of firm performance were the capital structure, the firm size, exchange rates and business risk. Moreover, Vatavu (2015) showed that the shareholders' equity has a positive connection with the performance indicators, whereas Return on Equity(ROE) and Return on Assets(ROA) were negatively affected by short-term and total debt.

2 Research Methodology

2.1 Introduction

The purpose of this study is to examine the impact of capital structure on the financial performance of the banking industry in Greece and establish the relationship between those two. More specifically, the study uses secondary data for the reason that its aim is to enlighten the impact of capital structure on the public systemic banks that are listed on the Athens Stock Exchange (ASE).

2.2 Data and Sample

The population of the study is the banking sector in Greece. The sample of the study is composed by observations of the four (4) systemic banks of Greece with range from year 2007 to 2018: Alpha Bank S.A., Eurobank Ergasias S.A., National Bank of Greece S.A., Piraeus Bank S.A. As main sources of data collection for the study, secondary consolidated data were used, retrieved from the annual reports of the sampled banks and from the ThomsonONE database in the purpose of fulfilling the study's objectives. Moreover, for the purpose of data analysis, EViews 9 software was used. A presentation of the study's main variables is presented in the Figure 1.

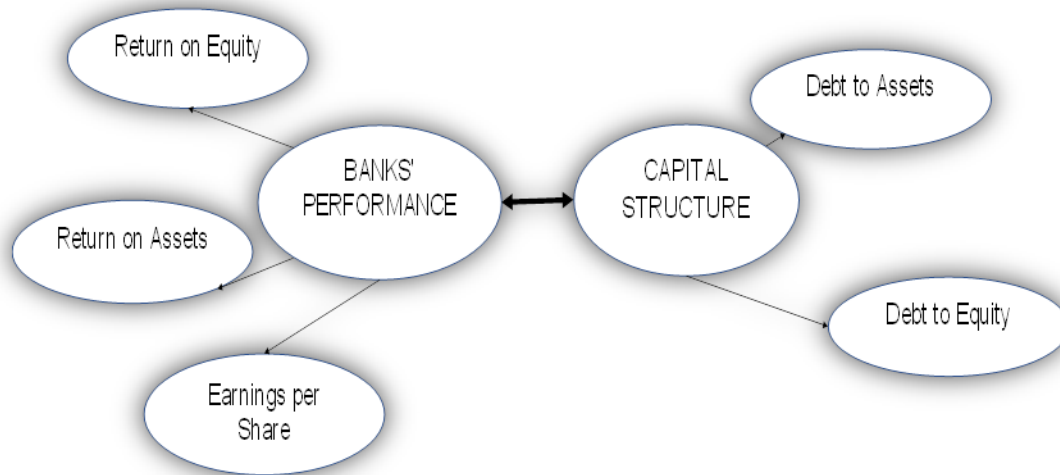


Figure 1: Presentation of the study's capital structure and profitability variables

2.3 Variables Definition

The overall study used profitability as a measure of assessing banks' performance. More indicatively, three dependent variables are used as measures of the banks' performance: Return on Equity (ROE), Return on Assets (ROA) and Earnings per Share (EPS). Furthermore, capital structure as an independent variable is measured by using Debt to Equity (D/E) and Debt to Assets (D/A) ratios. In addition, two control variables, Bank Size and Growth are also included as standard determinants of banks' profitability.

Return on Equity(ROE): ROE is used as a measure of profitability and it refers to the rate of return of the money that the equity investors have invested onto the firm. The ratio is calculated by the division of the firm's net income by its shareholder equity and measures the efficiency by which managers generate profits by using the firm's assets. It measures how efficiently the management is achieving the goal of shareholders' wealth maximization. For this study, the ratio included the average shareholder equity of the firms.

Return on Assets(ROA): ROA is also an indicator of profitability that demonstrates how profitable the firm is regarding its total assets. The ratio is calculated by the division of the firm's net income by its total assets. For this study, the ratio included the average total assets of the firms.

Earnings per Share(EPS): EPS is considered to be a measure of profitability in such a way by showing how much money a firm generates for each share of its stock. It is calculated as the net income of a firm and the subtraction of its preferred dividends, divided by the firm's common shares outstanding. The higher the ratio, the more profitable the firm is.

Debt to Equity(D/E): D/E is one of the most effective ways to understand the capital structure of a firm and the way to observe its financial leverage. The ratio is calculated by the division of the firm's total liabilities by its shareholder equity and measures the degree to which a firm finances its operations via debt against its internal resources.

Debt to Assets(D/A): D/A is also a financial leverage ratio which underlines the total amount of debt as compared to the firm's total assets. It is calculated by the division of short term and long term debt by the firm's total assets. Particularly, this ratio illustrates the amount of the firm's assets that were financed by its creditors.

Bank Size: Bank Size is considered to be an important determinant of the profitability and is included in the study as a control variable. Particularly, numerous studies (Yegon et al., 2014; Abor, 2008) have shown that this variable is positively connected with profitability. Additionally, Fan et al. (2012), in their model, calculated the firm size as the natural log of the total book value of assets. In this study as well, the banks' size in the model is calculated as the natural log of the banks' total assets.

Growth: Growth is also included in the study as a control variable. In order to measure the banks' growth, the study used the annual growth rate of the total assets of the banks.

2.4 Model Specification

Multiple regression models were used in order to investigate the relationship between the capital structure and the performance of the systemic banks in Greece. More specifically, three regression models were developed for the purpose of identifying this connection. These models take the following form:

$$Y_{it} = \alpha + \beta x_{it} + u_{it}$$

Where

Y : is denoted as the dependent variable

α : is denoted as the constant term

β : is denoted as the intercept

$\beta_1, \beta_2, \beta_3, \beta_4$: are denoted as coefficients
 x : is denoted as the independent variables
 u : is denoted as the error terms
 i : is denoted as the number of the banks
 t : is denoted as the number of time periods

Each of the three models is specifically formed as follows:

Return on Assets:

$$ROA_{it} = \beta_0_{it} + \beta_1 DE_{it} + \beta_2 DA_{it} + \beta_3 SIZE_{it} + \beta_4 GROWTH_{it} + u_{it}$$

Return on Equity:

$$ROE_{it} = \beta_0_{it} + \beta_1 DE_{it} + \beta_2 DA_{it} + \beta_3 SIZE_{it} + \beta_4 GROWTH_{it} + u_{it}$$

Earnings per Share:

$$EPS_{it} = \beta_0_{it} + \beta_1 DE_{it} + \beta_2 DA_{it} + \beta_3 SIZE_{it} + \beta_4 GROWTH_{it} + u_{it}$$

2.5 Research Hypothesis

The following hypotheses were formed in order to investigate the impact of the capital structure on the performance on the banking sector in Greece.

H0: Capital structure has no significant impact on the performance of the banks

H1: Capital structure has significant impact on the performance of the banks

3 Data Analysis and Interpretation

3.1 Empirical Results

3.1.1 Descriptive Statistics

Table 1 provides a summary of the descriptive statistics for both the dependent and independent variables of the study. All variables were calculated using balance sheet (book) values. The total number of observations was $43 \times 7 = 301$. The results of the descriptive statistics showed details regarding the variables of profitability as follows: the Return on Equity (ROE) presented a mean of -22,67%, a minimum of -797,53%, a maximum of 113,27%, the Return on Assets (ROA) presented a mean of -0,56%, a minimum of -6,05%, a maximum of 4,52% while the Earnings per Share (EPS) presented a mean of 1.068,71, a minimum of -687,22 and a maximum of 19375,76. Moreover, the descriptive statistics of the capital structure indicators showed the following: Debt to Equity (D/E) presented a mean of 88,20%, a minimum of 0% and a maximum of 298,98% while Debt to Assets (D/A) during the reporting years presented a mean of 5,99%, a minimum of 0% and a maximum 18,91%. As far as the control variables were concerned, the mean value of the size variable, measured by the natural log of the banks' total assets was observed to be 11,199 while its minimum and maximum values were found to be 10,745 and 11,701 respectively. Additionally, the growth variable had an average value of 2,08%, a minimum of -29,36% and a maximum value of 50,10%.

The negative percentages of Return on Equity and Return on Assets mean values suggested a poor performance during the period of study. Indicatively, the low levels of Return on Assets ratio showed that during the reporting years the managers of the

banks were not utilizing the banks' assets effectively. Additionally, the high levels regarding the mean of Debt to Equity ratio signal the fact that during the reporting years 2007-2018, in the middle of the global economic crisis, banks were highly affected and found to be financially leveraged with a large percentage of debt.

Table 1: Descriptive Statistics

	DEBT TO ASSETS	EPS	DEBT TO EQUITY	GROWTH	RETURN ON ASSETS	RETURN ON EQUITY	SIZE
Mean	0.059967	1068.713	0.882095	0.020870	-0.000560	-0.226758	11.19922
Median	0.048700	0.080000	0.688800	-0.015200	0.001400	0.009600	11.13297
Maximum	0.189100	19375.76	2.989800	0.501000	0.045200	1.132700	11.70143
Minimum	0.000000	-687.2200	0.000000	-0.293600	-0.060500	-7.975300	10.74564
Std. Dev.	0.050361	3316.935	0.843604	0.158091	0.017721	1.312730	0.248636
Skewness	0.846965	4.385638	1.039033	1.036482	-0.841096	-4.991494	0.482268
Kurtosis	3.114261	23.42707	3.185555	4.291394	5.826998	29.73323	2.315206
Jarque-Bera	5.164393	885.4428	7.798742	10.68707	19.38886	1459.000	2.507030
Probability	0.075608	0.000000	0.020255	0.004779	0.000062	0.000000	0.285500
Sum	2.578600	45954.68	37.93010	0.897400	-0.024100	-9.750600	481.5666
Sum Sq. Dev.	0.106523	4.62E+08	29.89001	1.049696	0.013189	72.37690	2.596440
Observations	43	43	43	43	43	43	43

3.1.2 Correlation Analysis

Table 2 regards the correlation matrix, which shows the correlation coefficients between the variables, indicating their relationship in this study. Correlation is used in order to measure the extent to which two or more variables fluctuate together. The correlations of the variables with themselves are always equal to one (1), and they can be found as the diagonal elements in the correlation matrix. In this study, Bank size (SIZE) was found to have negative association with all the other variables except the Growth variable. Additionally, Debt to Assets had a positive association with all the variables except for Bank Size (SIZE) and Growth, while Debt to Equity had a negative association with Return on Equity, Growth and Bank Size (SIZE), and a positive association with the rest of the variables. Further on, Earnings per Share (EPS) had a positive relationship with all the other variables besides the variables of Growth and Size. Return on Assets (ROA) was observed to have a positive relationship with all the other variables except for the Size, whereas Return on Equity (ROE) was observed to have a positive connection with Debt to Assets, Return on Assets and Earnings per Share (EPS). Finally, Growth variable appeared to have a positive relationship only with the variables of Size and Return on Assets.

It is evident from the table below that the strongest correlation is observed between Debt to Assets and Debt to Equity, the two capital structure measures. However, there is no significant issue of multicollinearity since the independent variables are not strongly correlated, and therefore there is no necessity to exclude any of the variables.

Table 2: Correlation Matrix

	SIZE	DEBT TO ASSETS	DEBT TO EQUITY	EPS	RETURN ON ASSETS	RETURN ON EQUITY	GROWTH
SIZE	1						
DEBT TO ASSETS	-0.287555	1					
DEBT TO EQUITY	-0.211578	0.887497	1				
EPS	-0.225404	0.512488	0.514039	1			
RETURN ON ASSETS	-0.203748	0.367622	0.182291	0.270991	1		
RETURN ON EQUITY	-0.273277	0.237784	-0.043477	0.124389	0.477620	1	
GROWTH	0.198739	-0.200205	-0.291977	-0.120412	0.066928	-0.233887	1

3.1.3 Regression Analysis

Regression Analysis refers to the statistical method which is used in order to measure the effect of one (independent) variable on another (dependent). The study uses regression analysis in order to test the hypothesis of whether there is a significant impact of capital structure on the profitability of the sampled banks.

Table 3 presents the summary of the Ordinary Least Squares (OLS) regression results given Return on Equity (ROE) as a dependent variable and Debt to Equity (D/E), Debt to Assets (D/A/), Growth and Bank Size (SIZE) as independent ones. The regression of these variables produced a coefficient of determination of 43,39% which means that the identified variables in this model account for 43,39% in the variability of Return on Equity, whereas the rest 56,61% is accounted for by other variables not included in the model. The coefficient of 35.08410 of Debt to Assets indicates that a unit increase in Debt to Assets will subsequently lead to 35.08410 unit increase in Return on Equity (ROE). Durbin-Watson (DW) test of 2,98 showed that there was no autocorrelation detected in the sample. The t-statistics value of 5.131843 combined with a p-value of 0.0000 showed that Debt to Assets is very significant in explaining the banks' performance as measured by Return on Equity variable, a factor which led to the conclusion that there is indeed a significant positive relationship between Debt to Assets and performance of the systemic banks listed in Athens Stock Exchange (ASE). This result suggests that an increase in the Debt to Assets ratio will also increase the profitability of the systemic banks in Greece, a matter which is also evident in the correlation analysis.

However, a negative relationship is observed between Debt to Equity and Return on Equity, as it is underlined by the coefficient of -2.116107. This means that a unit increase in Debt to Equity will result in 2.116107 unit decrease in Return on Equity. The absolute t-statistics value of 5.168092 compared with the p-value of 0.0000 showed that Debt to Equity is very significant in explaining the banks' performance as measured by the Return on Equity variable, a factor which led to the conclusion that there is a negative relationship between Debt to Equity and the performance of the systemic banks listed in ASE. This suggests that an increase in the Debt to Equity ratio will reduce the profitability of the systemic banks in Greece, a fact which is consistent with the results from the correlation analysis. During the reporting years, banks borrowed on higher volumes and therefore they also increased their interest payments, which had as a

consequence the reduction of their profits. The significant negative relationship that was found can be justified since lower profits that result from debt's interest payments tend to reduce ROE.

Size in terms of assets is statistically insignificant in explaining the banks' performance, regardless to the Growth variable, for which is evident that it has a statistically significant negative relationship with banks' performance. More indicatively, an increase in the banks' growth in terms of assets will result to a decrease in their profitability, as measured by the Return on Equity ratio.

Table 3: Regression ROE

Dependent Variable: RETURN ON EQUITY

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.881500	7.374494	0.797546	0.4301
DEBT TO EQUITY	-2.116107	0.409456	-5.168092	0.0000
DEBT TO ASSETS	35.08410	6.836551	5.131843	0.0000
SIZE	-0.561340	0.654089	-0.858201	0.3962
GROWTH	-2.826078	1.034395	-2.732108	0.0095
R-squared	0.487827	Mean dependent var	-0.226758	
Adjusted R-squared	0.433914	S.D. dependent var	1.312730	
S.E. of regression	0.987680	Akaike info criterion	2.922029	
Sum squared resid	37.06948	Schwarz criterion	3.126820	
Log likelihood	-57.82363	Hannan-Quinn criter.	2.997550	
F-statistic	9.048425	Durbin-Watson stat	2.981347	
Prob(F-statistic)	0.000031			

The regression model using Return on Assets (ROA) which is also a measure of assessing the banks' performance as the dependent variable, and Debt to Equity and Debt to Assets as measures of capital structure is presented in the table 4.

The regression of these variables produced a coefficient of determination of 16,49% which means that the identified variables in this model account for 16,49% in the variability of Return on Assets, whereas the rest 83,51% is accounted for by other variables not included in the model. The coefficient of 0.317536 of Debt to Assets indicates that a unit increase in Debt to Assets will subsequently lead to 0.317536 unit increase in Return on Assets (ROA). Durbin-Watson (DW) test of 1,82 showed that there was no autocorrelation detected in the sample. The t-statistics value of 2.832937 and the p-value of 0.0073 showed that Debt to Assets is very significant in explaining the banks' performance as measured by Return on Assets variable, a factor which led to the conclusion that there is indeed a positive relationship between Debt to Assets and performance of the systemic banks listed in ASE. This result suggests that an increase in the Debt to Assets ratio will also increase the profitability of the systemic banks in Greece, a matter which is also evident in the correlation analysis.

However, a negative relationship is observed between Debt to Equity and Return on Assets, as it is underlined by the coefficient of -0.012867. This means that a unit increase in Debt to Equity will result in 0.012867 unit decrease in Return on Assets. The absolute t-statistics value of 1.916630 compared with the p-value of 0.0628 showed that Debt to Equity is significant at 10% in explaining the banks' performance as measured by Return on Assets variable. This output suggests that an increase in the Debt to Equity

ratio will cause a decrease on the profitability of the systemic banks in Greece, a matter which is contrary to the positive relationship that was presented in the correlation matrix. Growth and Size in terms of assets are both statistically insignificant in explaining the banks' performance as measured by Return on Assets ratio.

Table 4: Regression ROA

Dependent Variable: RETURN_ON_ASSETS

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.064266	0.120907	0.531535	0.5981
DEBT TO EQUITY	-0.012867	0.006713	-1.916630	0.0628
DEBT TO ASSETS	0.317536	0.112087	2.832937	0.0073
SIZE	-0.006493	0.010724	-0.605512	0.5484
GROWTH	0.009736	0.016959	0.574109	0.5693
R-squared	0.244472	Mean dependent var	-0.000560	
Adjusted R-squared	0.164943	S.D. dependent var	0.017721	
S.E. of regression	0.016193	Akaike info criterion	-5.299497	
Sum squared resid	0.009964	Schwarz criterion	-5.094706	
Log likelihood	118.9392	Hannan-Quinn criter.	-5.223976	
F-statistic	3.073990	Durbin-Watson stat	1.827155	
Prob(F-statistic)	0.027442			

The regression model using Earnings per Share (EPS) which is also considered to be a measure of assessing the banks' performance as the dependent variable, and Debt to Equity and Debt to Assets as measures of capital structure is presented in the table 5.

The regression of these variables produced a coefficient of determination of 21,43% which means that the identified variables in this model account for 21,43% in the variability of Earnings per Share, whereas the rest 78,57% is accounted for by other variables not included in the model. The coefficient of 13546.61 of Debt to Assets indicates that a unit increase in Debt to Assets will subsequently lead to 13546.61 unit increase in Earnings per Share (EPS). Durbin-Watson (DW) test of 1,14 showed that there was no autocorrelation detected in the sample. The t-statistics value of 0.665669 and the p-value of 0.5096 showed that Debt to Assets is very insignificant in explaining the banks' performance as measured by Earnings per Share (EPS) variable, a factor which led to the conclusion that there is an insignificant positive relationship between Debt to Assets and performance of the systemic banks listed in ASE.

Moreover, a similar relationship is observed between Debt to Equity and Earnings per Share (EPS), as it is underlined by the coefficient of 1255.712. This means that a unit increase in Debt to Equity will result in 1255.712 unit increase in Return on Assets. The absolute t-statistics value of 1.030262 compared with the p-value of 0.3094 showed that Debt to Equity is insignificant in explaining the banks' performance as measured by Earnings per Share variable.

Growth and Size in terms of assets are both statistically insignificant in explaining the banks' performance as measured by Return on Assets ratio.

Table 5: Regression EPS

Dependent Variable: EPS
Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14917.36	21951.66	0.679555	0.5009
DEBT TO EQUITY	1255.712	1218.828	1.030262	0.3094
DEBT TO ASSETS	13546.61	20350.36	0.665669	0.5096
SIZE	-1409.383	1947.028	-0.723864	0.4736
GROWTH	734.5502	3079.083	0.238561	0.8127
R-squared	0.289173	Mean dependent var		1068.713
Adjusted R-squared	0.214350	S.D. dependent var		3316.935
S.E. of regression	2940.029	Akaike info criterion		18.91917
Sum squared resid	3.28E+08	Schwarz criterion		19.12396
Log likelihood	-401.7622	Hannan-Quinn criter.		18.99469
F-statistic	3.864723	Durbin-Watson stat		1.140948
Prob(F-statistic)	0.009909			

The outcome of the study showed mixed results. From the one hand there was evidence of significant impact of capital structure on Return on Assets and Return on Equity, however as far as Earnings per Share were concerned, the analysis showed that capital structure was insignificant in explaining the banks' performance.

The findings of the study are consistent to the findings of Awunyo-Vitor and Badu (2012), whose study found a significant negative relationship between Return on Equity and Debt to Equity. However, as regards the relationship between Return on Assets and Debt to Equity, their results showed an insignificant negative relationship. The results regarding capital structure as measured by Debt to Equity and profitability are consistent to the findings of Goyal (2013), who found a significant negative impact of the capital structure variable and the performance indicators as measured by ROE, ROA and EPS. Moreover, this fact implies that profitable firms are more dependent on equity as their main financing route (Goyal, 2013).

Furthermore, the results that concerned capital structure as measured by Debt to Assets ratio are consistent to the findings of Idode et al. (2014), whose study found that Debt to Assets ratio has a significant positive impact on the profitability of the Nigerian banks, as measured by Return on Equity. Accordingly, the results of the positive relationship of Debt to Assets with Return on Equity are similar to the findings of Gill et al. (2011).

The findings of the study were found to be inconsistent to the findings of Yegon et al. (2014), whose study regarding the banking sector of Kenya, found a statistically insignificant relationship between Return on Equity and Debt to Assets. Moreover, the results were also inconsistent to the findings of Shubita and Alsawalhah (2012), whose findings showed a negative relationship between Return on Equity and Debt to Assets.

In addition, the results of the study with regards to the relationship between Return on Equity, Return on Assets, Earnings per Share and Debt to Assets are inconsistent to the findings Siddik et al. (2017) who found a significant negative relationship between the capital structure and profitability variables.

Finally, the results of the study were consistent to the findings of Hasan et al. (2014), whose study found insignificant relationship between Earnings per Share and Debt to Assets. Nevertheless, their findings as regards to the relationship between Return on Equity, Return on Assets and Debt to Assets (insignificant negative relationship and

significant negative relationship accordingly) were inconsistent to the results of this study.

4 Conclusion

The study investigated the impact of capital structure on the financial performance of the systemic banks in Greece. In order to establish a comprehensive analysis of the study, numerous ideas were employed. Consolidated data were imported from secondary sources, mainly from the ThomsonONE database and the financial statements of the banks and were analyzed in line with the study's purpose. The population of the study consisted of all the banks listed on the Athens Stock Exchange (ASE). Accordingly, the study covered a sample from the four (4) systemic banks that were listed in the Athens Stock Exchange (ASE), covering a period of twelve (12) years, from 2007 to 2018. For the analysis of the data, multiple regression models and correlation analysis were used via the EViews 9 software.

The results from the regression analysis showed a significant positive relationship between Debt to Assets (D/A) and Return on Equity (ROE) as well as between Debt to Assets (D/A) and Return on Assets (ROA). Moreover, a significant negative relationship was presented, that is the one between Debt to Equity and Return on Equity (ROE) as well as between Debt to Equity and Return on Assets (ROA).

From the significant positive relationship between the Return on Equity (ROE) variable and the Debt to Assets ratio, trade-off theory is evident. The theory suggests that higher leverage contributes to higher profitability. Additionally, as banks take advantage of tax savings, the trade-off theory is also validated as tax savings derived from the use of debt provide income to the banks.

More indicatively, the study showed that an increase in the Debt to Assets (D/A) ratio has a significant positive impact on the performance of the listed systemic banks in Greece, which is measured by Return on Equity (ROE) and Return on Assets (ROA). Moreover, an increase in the Debt to Equity ratio has a significant negative impact on the performance of the listed systemic banks in Greece, which is measured by Return on Equity (ROE) and Return on Assets (ROA). Additionally, as capital structure is concerned, the analysis showed that it is insignificant in explaining the performance of the banks, as measured by Earnings per Share (EPS) ratio. However, due to fact that the sample of the study included data from the years that the global financial economic crisis was on its verge, the insignificance of the results regarding the Earnings per Share (EPS) performance ratio and the capital structure variables can be justified.

Consequently, as regards the hypothesis testing, the overall study rejects the null hypothesis which suggests that "Capital structure has no significant impact on the performance of the banks". The results of the study confirm the hypothesis (H1), which states that indeed capital structure has a significant impact on the performance of the banks in Greece.

The results of the study reflected the tremendous effect of the global financial crisis into the Greek economy by reducing financial liquidity and business activity. The banking system during the crisis was found to be robust up to some extent, but it faced some severe imported risks which led the banks resort to massive amounts of debt.

The management of the banks should be very prudent when they resort to debt as a source of financing their operations since this study signaled the fact that besides the positive relationship, there could be also a negative relationship between capital structure and financial performance variables. Moreover, as per the pecking order theory, managers should choose to finance their activities mostly with internal financing such as retained earnings, and lastly resorting to debt.

To conclude with, banks should be very cautious in designing their financing activities and capital structure decisions, whereas they should always be focused to the aim of achieving an optimum mixture of debt and equity in the purpose of maximizing their profitability.

4.1 Limitations and Recommendations for Future Research

The limitation of this study is that the sample only focuses on the systemic banks which are listed on the Athens Stock Exchange (ASE). In reality, there are several other banks that are listed on the ASE, therefore the results of the study regarding the *significant positive relationship* between capital structure and banks' performance may not represent the overall banking sector in Greece. Moreover, the time period of this study includes years within and after the economic crisis (2007-2018). In order to get more accurate and defined results, it would be more appropriate to create different regressions with data pre-crisis and post-crisis.

The study focused on the investigation of the impact of capital structure on the banks' performance. Future research should investigate generalizations of the study's findings beyond the systemic banks in Greece. Research should include a larger sample of all the listed banks in Athens Stock Exchange (ASE) as well as more capital structure variables such as short-term and long-term debt. Important control variables such as banks' age and ownership could be used in order to detect other determinants that affect the relationship between capital structure and banks' profitability. Moreover, since this study used mostly secondary data which are subjective in nature, it is recommended that the use of both primary-up to the level that this could be achieved- and secondary data should be included in order to obtain more solid information.

5 Bibliography

1. Abor, J. (2005). The effect of capital structure on profitability: an empirical analysis of listed firms in Ghana. *The journal of risk finance*, 6(5), 438-445.
2. Abor, J. (2008). Determinants of the capital structure of Ghanaian firms.
3. Aboura, S., & Lépinette, E. (2013). Do banks satisfy the Modigliani-Miller theorem?. Available at SSRN 2348608.
4. Aghion, P., Dewatripont, M., & Rey, P. (1999). Competition, financial discipline and growth. *The Review of Economic Studies*, 66(4), 825-852.
5. Ahmadimousaabad, A., Bajuri, N., Jahanzeb, A., Karami, M., & Rehman, S. (2013). Trade-off theory, pecking order theory and market timing theory: a comprehensive review of capital structure theories. *International Journal of Management and Commerce Innovations*, 1(1), 11-18.
6. Alexiou, C., & Sofoklis, V. (2009). Determinants of bank profitability: Evidence from the Greek banking sector. *Ekonomski Anali/Economic Annals*, 54(182).
7. Amidu, M. (2007). Determinants of capital structure of banks in Ghana: an empirical approach. *Baltic Journal of Management*, 2(1), 67-79.
8. Athanasoglou, P. P., Brissimis, S. N., & Delis, M. D. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of international financial Markets, Institutions and Money*, 18(2), 121-136.
9. Awan, A. G., & Amin, M. S. (2014). Determinants of capital structure. *European Journal of Accounting Auditing and Finance Research*, 2(9), 22-41.
10. Awunyo-Vitor, D., & Badu, J. (2012). Capital structure and performance of listed banks in Ghana.
11. Baker, M., & Wurgler, J. (2002). Market timing and capital structure. *The journal of finance*, 57(1), 1-32.
12. Berger, A. N., & Bouwman, C. H. (2013). How does capital affect bank performance during financial crises?. *Journal of Financial Economics*, 109(1), 146-176.
13. Berger, A. N., & Di Patti, E. B. (2006). Capital structure and firm performance: A new approach to testing agency theory and an application to the banking industry. *Journal of Banking & Finance*, 30(4), 1065-1102.
14. Brealey, R. A., Myers, S. C., Allen, F., & Mohanty, P. (2012). *Principles of corporate finance*. Tata McGraw-Hill Education.
15. Brigham, E. F., & Houston, J. F. (2013). Fundamentals of financial management, vol. 3, no. 3. *Mason, OH: South-Western Cengage Learning*.
16. Chen, D. H., Chen, C. D., Chen, J., & Huang, Y. F. (2013). Panel data analyses of the pecking order theory and the market timing theory of capital structure in Taiwan. *International Review of Economics & Finance*, 27, 1-13.
17. Chinaemerem, O. C., & Anthony, O. (2012). Impact of capital structure on the financial performance of Nigerian firms. *Oman Chapter of Arabian Journal of Business and Management Review*, 34(969), 1-19.
18. Constantinides, G. M., Harris, M., & Stulz, R. M. (Eds.). (2003). *Handbook of the Economics of Finance: Corporate finance*. Elsevier.

19. DeAngelo, H., & Masulis, R. W. (1980). Optimal capital structure under corporate and personal taxation. *Journal of financial economics*, 8(1), 3-29.
20. Deesomsak, R., Paudyal, K., & Pescetto, G. (2004). The determinants of capital structure: evidence from the Asia Pacific region. *Journal of multinational financial management*, 14(4-5), 387-405.
21. Ebaid, I. E. S. (2009). The impact of capital-structure choice on firm performance: empirical evidence from Egypt. *The journal of risk Finance*.
22. Fama, E. F., & French, K. R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *The review of financial studies*, 15(1), 1-33.
23. Fan, J. P., Titman, S., & Twite, G. (2012). An international comparison of capital structure and debt maturity choices. *Journal of Financial and quantitative Analysis*, 47(1), 23-56.
24. Flannery, M. J., & Rangan, K. P. (2006). Partial adjustment toward target capital structures. *Journal of financial economics*, 79(3), 469-506.
25. Gill, A., Biger, N., & Mathur, N. (2011). The effect of capital structure on profitability: Evidence from the United States. *International Journal of Management*, 28(4), 3
26. Gleason, K. C., Mathur, L. K., & Mathur, I. (2000). The interrelationship between culture, capital structure, and performance: evidence from European retailers. *Journal of business research*, 50(2), 185-191.
27. Goyal, A. M. (2013). Impact of capital structure on performance of listed public sector banks in India. *International journal of business and management invention*, 2(10), 35-43.
28. Hadlock, C. J., & James, C. M. (2002). Do banks provide financial slack?. *the Journal of Finance*, 57(3), 1383-1419.
29. Harris, M., & Raviv, A. (1991). The theory of capital structure. *the Journal of Finance*, 46(1), 297-355.
30. Hasan, M. B., Ahsan, A. M., Rahaman, M. A., & Alam, M. N. (2014). Influence of capital structure on firm performance: Evidence from Bangladesh. *International Journal of Business and Management*, 9(5), 184.
31. Hawaldar, I. T., Lokesh, L., & Biso, S. S. (2016). An empirical analysis of financial performance of retail and wholesale Islamic banks in Bahrain. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)*, 20(1), 137-147.
32. Hovakimian, A. (2006). Are observed capital structures determined by equity market timing?. *Journal of Financial and Quantitative analysis*, 41(1), 221-243.
33. Hovakimian, A., Opler, T., & Titman, S. (2001). The debt-equity choice. *Journal of Financial and Quantitative analysis*, 36(1), 1-24.
34. Huang, G. (2006). The determinants of capital structure: Evidence from China. *China economic review*, 17(1), 14-36.
35. Idode, P. E., Adeleke, T. M., Ogunlowore, A. J., & Ashogbon, O. S. (2014). Influence of capital structure on profitability: Empirical Evidence from listed Nigerian banks. *IOSR Journal of Business and Management*, 16(11), 22-28.
36. Jaros, J., & Bartosova, V. (2015). To the capital structure choice: Miller and Modigliani model. *Procedia Economics and Finance*, 26, 351-358.
37. Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *The American economic review*, 76(2), 323-329.

38. Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of financial economics*, 3(4), 305-360.
39. Kayhan, A., & Titman, S. (2007). Firms' histories and their capital structures. *Journal of financial Economics*, 83(1), 1-32.
40. Kyereboah-Coleman, A. (2007). The impact of capital structure on the performance of microfinance institutions. *The Journal of Risk Finance*, 8(1), 56-71.
41. Luigi, P., & Sorin, V. (2009). A review of the capital structure theories. *Annals of Faculty of Economics*, 3(1), 315-320.
42. Margaritis, D., & Psillaki, M. (2007). Capital structure and firm efficiency. *Journal of Business Finance & Accounting*, 34(9-10), 1447-1469.
43. Michaelas, N., Chittenden, F., & Poutziouris, P. (1999). Financial policy and capital structure choice in UK SMEs: Empirical evidence from company panel data. *Small business economics*, 12(2), 113-130.
44. Miller, M. H. (1977). Debt and taxes. *the Journal of Finance*, 32(2), 261-275.
45. Miller, M. H., & Modigliani, F. (1961). Dividend policy, growth, and the valuation of shares. *the Journal of Business*, 34(4), 411-433.
46. Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance and the theory of investment. *The American*, 1, 3.
47. Modigliani, F., & Miller, M. H. (1963). Corporate income taxes and the cost of capital: a correction. *The American economic review*, 53(3), 433-443.
48. Muhammad, H., Shah, B., & ul Islam, Z. (2014). The impact of capital structure on firm performance: Evidence from Pakistan. *산경연구논집 (IJIDB)*, 5(2), 13-20.
49. Musah, A. (2017). The impact of capital structure on profitability of commercial banks in Ghana. *Asian Journal of Economic Modelling*, 6(1), 21-36.
50. Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of financial economics*, 5(2), 147-175.
51. Myers, S. C. (1984). The capital structure puzzle. *The journal of finance*, 39(3), 574-592.
52. Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of financial economics*, 13(2), 187-221.
53. Pinto, P., & Joseph, N. R. (2017). Capital structure and financial performance of banks. *International Journal of Applied Business and Economic Research*, 15, 303-312.
54. Saeed, M. M., Gull, A. A., & Rasheed, M. Y. (2013). Impact of capital structure on banking performance (A case study of Pakistan). *Interdisciplinary journal of contemporary research in business*, 4(10), 393-403.
55. San, O. T., & Heng, T. B. (2011). Capital structure and corporate performance of Malaysian construction sector. *International Journal of Humanities and Social Science*, 1(2), 28-36.
56. Shubita, M. F., & Alsawalhah, J. M. (2012). The relationship between capital structure and profitability. *International Journal of Business and Social Science*, 3(16).
57. Siddik, M., Alam, N., Kabiraj, S., & Joghee, S. (2017). Impacts of capital structure on performance of banks in a developing economy: Evidence from Bangladesh. *International journal of financial studies*, 5(2), 13.

58. Spathis, C., Kosmidou, K., & Doumplos, M. (2002). Assessing profitability factors in the Greek banking system: A multicriteria methodology. *International Transactions in operational research*, 9(5), 517-530.
59. Swanson, Z., Srinidhi, B. N., & Seetharaman, A. (2003). *The capital structure paradigm: evolution of debt/equity choices*. Greenwood Publishing Group.
60. Taani, K. (2013). Capital structure effects on banking performance: A case study of Jordan. *International Journal of Economics, Finance and Management Sciences*, 1(5), 227-233.
61. Tarek Al-Kayed, L., Raihan Syed Mohd Zain, S., & Duasa, J. (2014). The relationship between capital structure and performance of Islamic banks. *Journal of Islamic Accounting and Business Research*, 5(2), 158-181.
62. Titman, S., & Wessels, R. (1988). The determinants of capital structure choice. *The Journal of finance*, 43(1), 1-19.
63. Vătavu, S. (2015). The impact of capital structure on financial performance in Romanian listed companies. *Procedia Economics and Finance*, 32, 1314-1322.
64. Warner, J. B. (1977). Bankruptcy costs: Some evidence. *The journal of Finance*, 32(2), 337-347.
65. Weill, L. (2008). Leverage and corporate performance: does institutional environment matter?. *Small Business Economics*, 30(3), 251-265.
66. Welch, I. (2004). Capital structure and stock returns. *Journal of political economy*, 112(1), 106-131.
67. Williams, J. (1987). Perquisites, risk, and capital structure. *The Journal of Finance*, 42(1), 29-48.
68. Yegon, C., Cheruiyot, J., Sang, J., & Cheruiyot, P. (2014). The Effects of Capital Structure on Firm's Profitability: Evidence from Kenya's Banking Sector. *Research Journal of Finance and Accounting*, 5(9).

6 Appendix

6.1 Figures

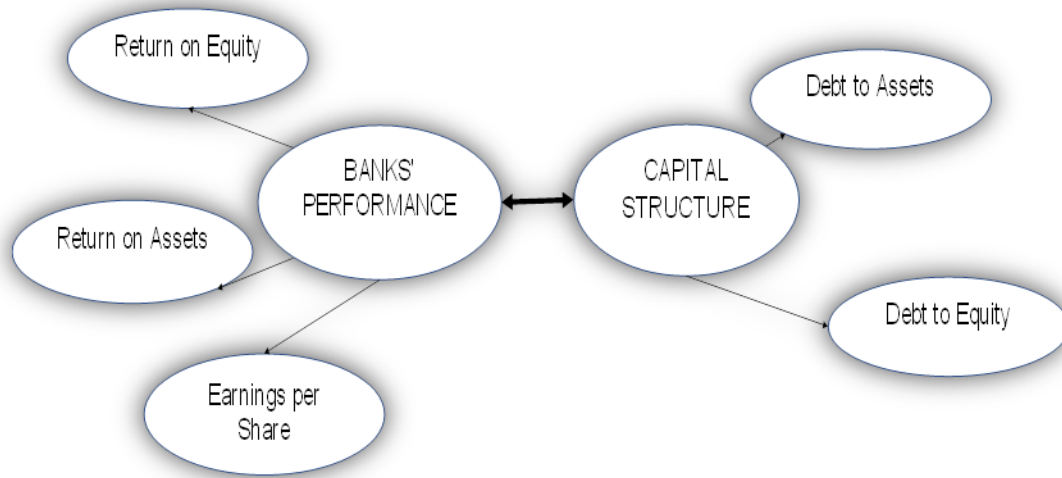


Figure 1: Presentation of the study's capital structure and profitability variables

6.2 Tables

Table 1: Descriptive Statistics

	DEBT TO ASSETS	EPS	DEBT TO EQUITY	GROWTH	RETURN ON ASSETS	RETURN ON EQUITY	SIZE
Mean	0.059967	1068.713	0.882095	0.020870	-0.000560	-0.226758	11.19922
Median	0.048700	0.080000	0.688800	-0.015200	0.001400	0.009600	11.13297
Maximum	0.189100	19375.76	2.989800	0.501000	0.045200	1.132700	11.70143
Minimum	0.000000	-687.2200	0.000000	-0.293600	-0.060500	-7.975300	10.74564
Std. Dev.	0.050361	3316.935	0.843604	0.158091	0.017721	1.312730	0.248636
Skewness	0.846965	4.385638	1.039033	1.036482	-0.841096	-4.991494	0.482268
Kurtosis	3.114261	23.42707	3.185555	4.291394	5.826998	29.73323	2.315206
Jarque-Bera	5.164393	885.4428	7.798742	10.68707	19.38886	1459.000	2.507030
Probability	0.075608	0.000000	0.020255	0.004779	0.000062	0.000000	0.285500
Sum	2.578600	45954.68	37.93010	0.897400	-0.024100	-9.750600	481.5666
Sum Sq. Dev.	0.106523	4.62E+08	29.89001	1.049696	0.013189	72.37690	2.596440
Observations	43	43	43	43	43	43	43

Table 2: Correlation Matrix

	SIZE	DEBT TO ASSETS	DEBT TO EQUITY	EPS	RETURN ON ASSETS	RETURN ON EQUITY	GROWTH
SIZE	1						
DEBT TO ASSETS	-0.287555	1					
DEBT TO EQUITY	-0.211578	0.887497	1				
EPS	-0.225404	0.512488	0.514039	1			
RETURN ON ASSETS	-0.203748	0.367622	0.182291	0.270991	1		
RETURN ON EQUITY	-0.273277	0.237784	-0.043477	0.124389	0.477620	1	
GROWTH	0.198739	-0.200205	-0.291977	-0.120412	0.066928	-0.233887	1

Table 3: Regression ROE

Dependent Variable: RETURN ON EQUITY

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.881500	7.374494	0.797546	0.4301
DEBT TO EQUITY	-2.116107	0.409456	-5.168092	0.0000
DEBT TO ASSETS	35.08410	6.836551	5.131843	0.0000
SIZE	-0.561340	0.654089	-0.858201	0.3962
GROWTH	-2.826078	1.034395	-2.732108	0.0095
R-squared	0.487827	Mean dependent var		-0.226758
Adjusted R-squared	0.433914	S.D. dependent var		1.312730
S.E. of regression	0.987680	Akaike info criterion		2.922029
Sum squared resid	37.06948	Schwarz criterion		3.126820
Log likelihood	-57.82363	Hannan-Quinn criter.		2.997550
F-statistic	9.048425	Durbin-Watson stat		2.981347
Prob(F-statistic)	0.000031			

Table 4: Regression ROA

Dependent Variable: RETURN_ON_ASSETS

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.064266	0.120907	0.531535	0.5981
DEBT TO EQUITY	-0.012867	0.006713	-1.916630	0.0628
DEBT TO ASSETS	0.317536	0.112087	2.832937	0.0073
SIZE	-0.006493	0.010724	-0.605512	0.5484
GROWTH	0.009736	0.016959	0.574109	0.5693
R-squared	0.244472	Mean dependent var		-0.000560
Adjusted R-squared	0.164943	S.D. dependent var		0.017721
S.E. of regression	0.016193	Akaike info criterion		-5.299497
Sum squared resid	0.009964	Schwarz criterion		-5.094706
Log likelihood	118.9392	Hannan-Quinn criter.		-5.223976
F-statistic	3.073990	Durbin-Watson stat		1.827155
Prob(F-statistic)	0.027442			

Table 5: Regression EPS

Dependent Variable: EPS

Method: Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	14917.36	21951.66	0.679555	0.5009
DEBT TO EQUITY	1255.712	1218.828	1.030262	0.3094
DEBT TO ASSETS	13546.61	20350.36	0.665669	0.5096
SIZE	-1409.383	1947.028	-0.723864	0.4736
GROWTH	734.5502	3079.083	0.238561	0.8127
R-squared	0.289173	Mean dependent var		1068.713
Adjusted R-squared	0.214350	S.D. dependent var		3316.935
S.E. of regression	2940.029	Akaike info criterion		18.91917
Sum squared resid	3.28E+08	Schwarz criterion		19.12396
Log likelihood	-401.7622	Hannan-Quinn criter.		18.99469
F-statistic	3.864723	Durbin-Watson stat		1.140948
Prob(F-statistic)	0.009909			